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Room temperature ferromagnetic-like response in “bulk” Y-doped CeO2

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Abstract

© 2017 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim Strong ferromagnetic-like response is observed at room temperature in “bulk”- and nano-crystalline Y-doped CeO 2 . The saturation magnetization for “bulk” (~600 nm) crystallites of CeO 2 doped with 25 at.% Y is more than an order of magnitude higher compared to its nanocrystalline (~10 nm) counterpart. High frequency electron spin resonance and 89 Y nuclear magnetic resonance measurements indicate clustering of electronic defects in the “bulk” crystallites. The remarkable size dependence of the magnetic behavior likely originates from a collective magnetic response of defect-lined nanodomain interfaces in the “bulk” crystallites, consistent with the giant orbital paramagnetism model.

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Keywords

CeO 2, defects, electron spin resonance, ferromagnetism, nanoparticles

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